

NOTE ON THE ALPINE DWARFING OF POLYGONUM  
BISTORTA

BY J. ARTHUR HARRIS

In evolutionary writings one frequently meets statements concerning increased variability of a species subjected to new conditions.\* In connection with some work on this question, it seemed worth while to consider the variability in individual habitats of a species ranging from lowland to alpine conditions. The familiar *P. Bistorta* L. of the Rocky Mountain region appeared to be a good subject. In August, 1906, I collected seven small series for a preliminary investigation, in the Pikes Peak and Mount Garfield region of Colorado. The localities need not be described in detail.

The series are numbered in the order of (as it seemed to me) increasingly alpine conditions.† The diagram shows the length of the flowering stalks. The crosses on the bars show the mean value and length of the bars the range in variation for the several series.

Expressing the results in the convenient biometric constants, we note from the table that as the conditions become more alpine the average length and the standard deviation, measuring the absolute variability around the mean length, greatly decrease. But when we express variability in relative terms by taking the ratio of the absolute variability to the mean, *i.e.*, Standard Deviation  $\times 100 / \text{Mean} = \text{coefficient of variation}$ , we note that the variability is about the same from habitat to habitat. Considering fluctuations due to sampling it is not safe to say that the coefficients of variation differ at all among themselves. But it is noticeable that the coefficients of variation are lowest for lots I and VII which have the maximum and the minimum development of stalk length. These are also unquestionably

\* For a review of some of the pertinent literature see Harris, Amer. Nat. 43: 350-355. 1909.

† Elevation is the only point upon which quantitative information could be secured. By Alpine I have understood more the ecological condition than the altitude merely. In making my estimates I was guided by the general physical surroundings and by the appearance of the vegetation.

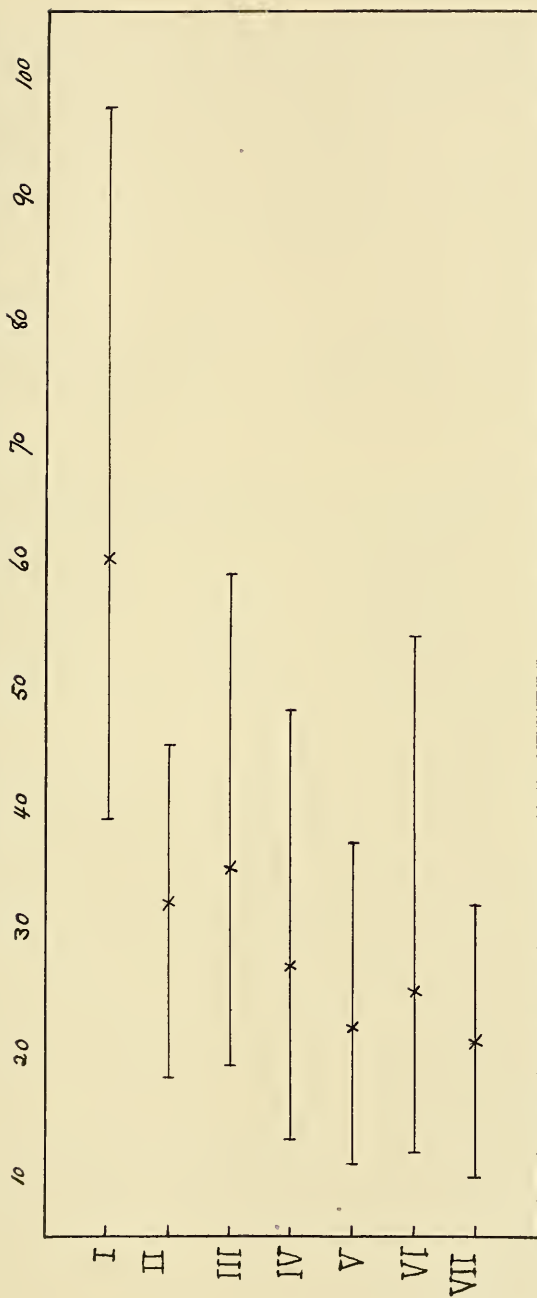


FIG. 1. Diagram showing length of flowering stalks in centimeters for seven habitats. I is the lowest and VII is the most alpine. The length of the bars show the range in variation while the crosses show the mean weight.

the ecological extremes of the series — lot I the lowest habitat, a moist meadow thicket near the "Half Way House," and lot VII the highest, the alpine meadow at "Windy Point."

This result is, I think, suggestive. The problem which it raises is this: In a series of habitats (ranging from the most lowland to the most alpine conditions), each apparently uniform in itself, is the lowest variability found in the most extreme environments?

The present data are of course quite inadequate for an answer to the problem. The purpose of this note is merely to call it to the attention of other botanists who in vacations in the mountains may have the opportunity of securing data really ample for its solution.

Lot	Plants Measured	Mean and Probable Error	Absolute Variability and Probable Error	Relative Variability and Probable Error
I	185	60.24 ± .59	11.81 ± .41	19.6 ± 0.7
II	37	32.78 ± .92	8.27 ± .65	25.2 ± 2.1
III	85	36.16 ± .55	7.47 ± .39	20.7 ± 1.1
IV	106	27.59 ± .46	7.01 ± .32	25.4 ± 1.3
V	68	22.47 ± .50	6.09 ± .35	27.0 ± 1.7
VI	139	25.02 ± .40	6.93 ± .28	27.7 ± 1.2
VII	117	21.00 ± .28	4.42 ± .19	21.0 ± 1.0

## THE PRESERVATION OF OUR NATIVE PLANTS

In August, 1901, the Misses Olivia and Caroline Phelps Stokes presented to the New York Botanical Garden a fund of \$3,000, the interest of which has been used for the protection of native plants. Various methods have been tried, beginning with a series of three prizes for essays on this subject, offered first to the teachers and older persons, which resulted in a number of good essays, the best of which were printed in the *Journal* of the New York Botanical Garden in 1902 and 1904. The prize essays were written by Dr. F. H. Knowlton, U. S. National Museum, Washington, D. C.; Miss Cora H. Clarke, daughter of James Freeman Clarke of Boston; Dr. A. J. Grout, Boys' High School, Brooklyn; Miss Mary Perle Anderson, supervisor of nature study, University School for Girls, Chicago, Ill.; Miss Jean Broadhurst, of Teachers' College, Columbia University, and Mr. G. Gordon Copp.

In 1910 another series of smaller prizes were offered to students in the high schools, and these were won by students from the Washington Irving High School, the boys high school in Brooklyn and the Morris High School, Bronx.

Finding that many of the wild flowers were gathered by the children for their teachers and that large quantities were supplied for the high schools of New York City, it was arranged through the interest of one of the members of the board of education that the following wild flowers should be eliminated from the list of botanical supplies in the New York public schools: trailing arbutus, wild columbine, fringed gentian, hepatica, Indian turnip, moccasin flower, wake-robin, wild orchid; and cultivated plants have been substituted for wild ferns, Solomon's seal, wild geranium and others.

During the year 1912 and the present year, the accumulated income of the Stokes' Fund has been used for colored illustrations for a series of essays on "Wild Plants Needing Protection" and has included (1) the Jack-in-the-pulpit; (2) spring beauty; (3) wild pink; (4) wild columbine; (5) bird's foot violet; (6) wild azalea; (7) moccasin flower; (8) dog-wood and (9) laurel. The essays have been reprinted and may be had at a nominal price from the New York Botanical Garden. Extra copies of the colored plates have been made and are to be distributed to the schools of New York City for framing.

Lectures illustrated by colored lantern-slides, have also been given under the auspices of the Garden. In this way a general interest has been aroused, which has resulted in the foundation of the "Wild Flower Preservation Society of America" with a large membership in various cities of the east. Local chapters have been organized in several of them, and further information may be had on application to

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